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EDITORIAL.

Feeding Trials with Pigs.

Experiments devised to study the effect of the feeding of Chinese pigs with a scientifically balanced ration are described in an article from Messrs. T. D. Marsh and N. Kanagaratnam which we publish in this number. The results are remarkable in that they show that with suitable feeding weight is gained at almost double the rate normally achieved by the small-holding pig-keeper. The balanced ration, however, is considerably more expensive than the unscientific ration, so that the simple direct monetary advantage of the former ration is not as great as appears at first sight. The main advantage of scientific feeding is not only an improvement in the quality of the flesh, but early maturity, by which the breeder obtains a much quicker turn-over of his capital—a matter which affects the profits and income derived by the breeder and feeder almost as much as the cost of food and the price obtained for his fat pigs.

Perhaps no results of investigations conducted by the Department of recent years are more immediately fruitful of practical application than those that relate to the pig industry. This industry is mainly in the hands of Chinese, some of whom possess herds of considerable numbers, while the keeping of a few pigs also enters into the economy of the Chinese small vegetable gardener. Recently too, Tamil peasantry on Settlements have successfully included pig keeping with the cultivation of market garden crops.

Hitherto, the Chinese pig-keeper has lost little time in appreciating the improvements made in breeding, and there is no doubt that the financial advantage of scientific feeding will equally appeal to him. Knowledge of this success in feeding quickly spreads and the most useful propaganda is that whereby the information is gained through demonstration. Pig breeding, however, is conducted throughout the country, and the publication of this information through the Chinese Agricultural Journal and the Chinese press in the near future will place Chinese breeders in possession of this information at an early date.

It is more difficult to bring these facts home to the Tamil pig-keepers, many of whom are illiterate or whose mentality is such that they can understand the written word only in its simplest terms.

We would appeal, therefore, to employers of Tamil labour engaged in pig-keeping to bring to their notice the important results which are here detailed.

Lalang Grass and Coconuts.

The fact that unchecked growth of lalang grass has an injurious effect on the growth of coconuts is well-known. In the article on another page on "The Effect of Lalang Grass (*Imperata arundinacea*) on Growth of Coconuts," Mr. R. B. Jagoe summarizes an experiment designed to measure this effect, under controlled conditions, on the growth and yield of dwarf coconut palms.

Under the conditions of this experiment, the palms were grown under three systems, *viz.*: with unrestricted lalang grass, clean weeded, and with a cover crop.

Measurements of growth and yield under each system show the remarkable deleterious effect of the presence of lalang grass, while trees grown with a cover crop were slightly superior to those grown on the clean weeded areas.

The Malayan Exhibition.

The fifteenth Malayan Exhibition, held as usual at Kuala Lumpur, has come and gone, and one is left wondering how far the hard work, the elaborate organization that has been built up, and the expense of staging an event of this nature is justified by results. We have heard the doubt expressed from time to time and without an intimate knowledge of the effect in the districts—and more particularly in the less accessible districts —such criticisms are not easily answered.

It may be accepted that essentially the Exhibition is in four parts: a trade exhibition for the more important import firms; an agricultural and horticultural show; a market for the arts and crafts of the villages, and an educational and demonstration centre for certain Government departments.

Dealing with these four points seriatim. It is to be assumed that the Agency houses and import merchants appreciate this opportunity of displaying their goods, otherwise they would not be exhibitors. It is noticeable that the greater part of the Exhibition is taken up by stands with exhibits of direct agricultural interest. The opportunity of showing these goods to practical agriculturists is unique and of mutual benefit.

The Agricultural Show is of restricted use unless carefully organized on a Malayan basis. The improvement in organization which is evident during the past few years has greatly added to the value of the Show. The small-holder takes a real pride in winning a prize at the Exhibition, and this must act as a stimulus to increased efforts to improve quality. The Agricultural Show is chiefly valuable in respect of products for which preparation is a factor of importance. For such products as rubber and copra, the Show organized on a Malayan basis has an educational value, for it provides a culminating point to the endeavours at the district shows throughout the country to demonstrate standards, and spreads knowledge of what constitutes good quality.

The development of the Exhibition as a market for village arts and crafts has in recent years been very marked. Those most conversant with village life appreciate the value to the villagers themselves of arts and crafts, for it not only makes for contentment in useful occupation, but the extra money is a welcome addition to slender incomes. The very considerable sales effected show the demand for such articles, while with wise guidance the villager is now making more useful articles than he used to do.

That the Exhibition is valuable for educational purposes is self-evident. One only has to witness the interest displayed in the exhibits of the Infant Welfare Section to be convinced.

We contend therefore that the annual Malayan Exhibition is performing a useful service to the country and we wish it continued success.

Original Articles.

FEEDING TRIALS WITH PURE-BRED CHINESE PIGS

By

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&

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The Chinese breeds of swine in Malaya are generally considered to be slow to mature despite the standard practice of mating them (particularly boars) before they are fully grown.

Amongst live-stock authorities early mating is regarded as one of the methods whereby early maturity may be developed. The Chinese pigs appear to arrive at sexual maturity quite as early if not earlier than European pigs.

The experiment here described was undertaken with the piebald type of Chinese pig to find the difference in the rate of increase of live-weight in pigs fed on balanced rations and those fed under Chinese small-holding management.

The feeding experiment consisted of two carefully matched weaner groups (A) and (B) of 4 pigs each. These pigs were litter-mates from 14 farrowed on 3rd September, 1937 and weaned at the age of eight weeks. Group A, consisting of two castrated males and two females was brought to the Stock Farm, Serdang, and numbered, whilst the similar group (B) were also numbered and left with the Chinese breeder to be fed in the Chinese small-holding method.

The results of previous feeding trials with Middle White pigs carried out on this Station and published in *The Malayan Agricultural Journal* for March, 1938, led to the conclusion that Rations A1 and A2 gave good results with weaners and young pigs respectively. Therefore the same balanced rations as detailed hereunder were used in this experiment:—

Ration A1. (Balanced)

The quantities given are sufficient per day for 1,000 lbs. live-weight of pigs each averaging approximately 44 lbs.

Food	Quantity lbs.	Digestible protein. per cent.	Fat. per cent.	N-free extract per cent.	Dry matter per cent.
Broken rice ...	26	1.66	.08	20.77	23.03
Rice polishings ...	3	.21	.34	1.22	2.70
Coconut cake ...	5	.64	.43	2.34	4.41
Soya bean cake ...	11	4.01	.40	2.58	9.22
Guinea grass ...	10	.09	—	.79	2.50
Banana stems ...	20	.02	.02	.07	1.02
Palm oil ...	1	—	1.00	—	1.00
Minerals ...	0.5	—	—	—	.50
Total ...	76.5	6.63	2.27	27.77	44.38

Ration A2. (Balanced)

The quantities given are sufficient per day for 1,000 lbs. live-weight of pigs each averaging approximately 88 lbs.

Food	Quantity lbs.	Digestible protein. per cent.	Fat. per cent.	N-free extract per cent.	Dry matter per cent.
Tapioca tubers ...	50	.50	—	15.40	17.50
Rice polishings ...	6	.42	.68	2.44	5.40
Coconut cake ...	6	.77	.51	2.84	5.29
Soya bean cake ...	9	3.29	.32	2.11	7.54
Palm oil ...	1	—	1.00	—	1.00
Minerals ...	.50	—	—	—	.50
TOTAL ...	72.50	4.98	2.51	22.79	37.23

Chinese Ration B1. (Unbalanced).

Food	Quantity lbs.	Digestible protein. per cent.	Fat. per cent.	N-free extract per cent.	Dry matter per cent.
Broken rice ...	3	.19	.009	2.39	2.65
Water hyacinth ...	3	.02	.002	.084	.17
Rice bran ...	5	.46	.94	1.45	4.62
Ikan busok ...	.5	.11	—	—	.25
TOTAL ...	11.5	.78	.951	3.924	7.69

Chinese Ration B2. (Unbalanced).

Food	Quantity lbs.	Digestible protein. per cent.	Fat. per cent.	N-free extract per cent.	Dry matter per cent.
Tapioca tubers ...	20	.2	—	6.16	7.00
Water hyacinth ...	10	.07	.01	.28	.59
Rice bran ...	10	.92	1.88	2.91	9.24
Soya bean cake ...	3	1.09	.10	.69	2.51
Ikan busok ...	1	.22	—	—	.50
TOTAL ...	44	2.50	1.99	10.04	19.84

Cost of Rations.

A 1 Ration.			Cost per lb.	Cost of 76.5 lbs. *i.e.* sufficient to feed 1000 lbs. pigs for one day
			cents	cents
Broken rice	26 lbs.	...	2.62	68.12
Rice polishings	3 lbs.	...	1.72	5.16
Coconut cake	5 lbs.	...	2.81	14.05
Soya Bean cake	11 lbs.	...	3.56	39.16
Red Palm Oil	1 lb.	...	10.00	10.00
Minerals	0.5 lb.	...	4.00	2.00
Guinea grass	10 lbs.	...		5.00
Banana stems	20 lbs.	...		

Ration 76.5 lbs. costs $1.43.
100 lbs. of ration will cost $1.87.
The concentrates alone cost $2.98 per 100 lbs.
76½ lbs. of this ration will feed for one day about 22 pigs each weighing about 45 lbs. or 1000 lbs. live weight of pigs.

A 2 Ration.			Cost per lb.	Cost of 72½ lbs. *i.e.* sufficient to feed 1000 lbs. pigs for one day
			cents	cents
Tapioca tubers	50 lbs.	...		34.00
Rice polishings	6 lbs.	...	1.72	10.32
Coconut cake	6 lbs.	...	2.81	16.86
Soya Bean cake	9 lbs.	...	3.56	32.04
Palm Oil	1 lb.	...	10.00	10.00
Minerals	.5 lb.	...	4.00	2.00

Ration =72½ lbs. cost $1.05.
100 lbs. of ration will cost $1.45.
100 lbs. of the concentrates cost $3.17.

It must be appreciated that 72½ lbs. of this ration will feed 1000 lbs. of pigs, each weighing about 88 lbs., or 11 pigs for one day.

These figures include the succulent 50 lbs. of tapioca.

Table I.

Comparative Weights of Individual Pigs in Groups A and B.

Dates.	Group A (Serdang Fed). Rations A1 and A2.						Group B (Holding fed) Rations B1 and B2				
	Age of pigs in days.	Barrow No. 83	Barrow No. 85	Gilt No. 91	Gilt No. 89	Total	Barrow No. 50	Barrow No. 73	Gilt No. 61	Gilt No. 47	Total
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
29.10.37* ...	56	12.0	11	11.25	10.75	45	12	11	11.25	10.75	45
30.11.37 ...	88	14.75	13.75	14.75	13.75	57	13	12	13	12	50
1. 1.38 ...	119	25	24	23	23.50	95.50	15	14	15.75	13.25	58
1. 2.38 ...	150	48	40	50	45	183	26	24	23	21	94
1. 3.38 ...	178	73	60	70	70	273	38	36	39	34	147
1. 4.38 ...	209	96	85	100	104	385	54	51	55	50	210
Total live-weight increase during experiment ...		84	74	88.75	93.25	340 85 av.	42	40	43.75	39.25	165 41.25 av.
Live-weight increase per day during experiment ...		.549	.483	.580	.610	2.222 .555 Average	.275	.261	.286	.257	1.079 .269 av.

* Start of Experiment.

Table III.

Table giving Comparative Increase in Live-weight Gain per Pig per Day.

Date	Age of pigs in days.	Interval between recording weights.	Group A (Chinese Pigs fed on Rations A1 & A2 at Serdang Farm.)			Group B (Chinese pigs on Rations B1 and B2, Holding fed)		
			Total weight of four pigs.	Average weight per pig.	Average live-weight gain per pig per day.	Total weight of four pigs.	Average weight per pig.	Average live-weight gain per pig per day.
			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
29-10-37	56		45	11.25		45	11.25	
30-11-37	88	32 days	57	14.37	.0975	50	12.50	.039
1- 1-38	119	31 „	95.50	23.87	.306	58	14.50	.065
1- 2-38	150	31 „	183	45.75	.706	94	23.50	.290
1- 3-38	178	28 „	273	68.25	.804	147	36.75	.473
1- 4-38	209	31 „	385	96.25	.903	210	52.50	.508

In a previous feeding trial at Serdang Middle White pigs fed on Rations A1 and A2 from the age of

63	days to	91	gained	an average of	.46	lbs.	per pig	per day.
91	— 119		„	„	1.21	„	„	„
119	— 133		„	„	1.09	„	„	„
133	— 147		„	„	.36	„	„	„
147	— 173		„	„	.63	„	„	„

Remarks on the Chinese Rations.

Assuming that the "dry matter" necessary for the normal appetite of pigs of specific weights are those as given by Kellner, the ration B1 is about 20 per cent. deficient in nitrogen-free extract and proteins, while there is an excess of crude fat. The ration B2 is deficient in nitrogen-free extract and again has excess fat.

The proportions of foods comprising the Chinese ration are detailed above, but it is unlikely the pig keepers weigh the constituents of the ration and the amounts recorded probably vary from day to day.

The tapioca and banana stems fed in rations A1 and A2 were cooked by steaming, while rations B1 and B2 were cooked by boiling in an open pan.

The experiment commenced with weaners at 56 days old. Group A received ration A1 from weaning for a period of 94 days, for a further period of 59 days they were fed on ration A2.

Th pigs in Group B fed by the Chinese squatter received ration B1 for one month after weaning and ration B2 from that age until the completion of the experiment which was a total period of 153 days.

The following are the results of the experiment:—

Table II.

Summary of Weights of Groups A and B at Different Stages of Growth.

Age of Pigs and Dates.		Group A (Serdang Fed. on Rations A1 & A2)		Group B (Holding Fed. on Rations B1 & B2.)	
		Total wt. of four pigs.	Average wt. per pig.	Total wt. of four pigs.	Average wt. per pig.
	From birth.	lbs.	lbs.	lbs.	lbs.
29-10-37	56 days	45	11.25	45	11.25
30-11-37	88 „	57	14.37	50	12.50
1- 1-38	119 „	95.5	23.87	58	14.50
1- 2-38	150 „	183	45.75	94	23.50
1- 3-38	178 „	273	68.25	147	36.75
1- 4-38	209 „	385	96.25	210	52.50

The difference between the average live-weight gains per animal in Groups A and B was 43.75 lbs. during the period of the experiment of 153 days.

Comments on the Results.

The average live-weight gains per pig per day during the experiment with Chinese pigs on rations A1 and A2 compared with B1 and B2 were 0.555 lbs. and 0.270 lbs. respectively, while the Middle White pigs on a previous trial at Serdang with Ration A1 and A2 gave a live-weight gain of .89 lbs. per day, which compares favourably with English standards.

The above tables show in comparison to previous trials with Middle White pigs on identical rations that store Chinese pigs require to be two months older than Middle Whites to reach the same average weights, but beyond this point of development they make similar live-weight gains per day, which suggests that Chinese pigs require two months longer to attain slaughter weight.

The concentrates consumed by Chinese pigs per pound live-weight gain at Serdang was 4.7 lbs. This figure was obtained by deleting 90 per cent. of moisture content of tapioca root, banana stems and Guinea grass in Rations A1 and A2 to make them comparable with the rest of the meals in the rations. The Middle White pigs at Serdang at similar ages and on identical rations required 3.01 lbs. of concentrates for one pound live-weight gain.

The amount of Ration A1 fed was 825 lbs. and A2 ration was 1,419 lbs., a total of 2,245 lbs. Therefore A1 ration adjusted for moisture content as above was 575 lbs. and A2 was 919 lbs. or a total of 1,494 lbs.

This experiment indicates that the live-weight increase of pigs fed on a balanced ration was almost double that of the pigs under this particular small-holding management.

Assuming that this small-holding management represents an average rate of feeding, these experiments indicate that Chinese pigs will gain in live-weight on balanced rations at almost double the rate normally achieved by the small-holding pig-keeper.

The dam of the litter of 14 from which the pigs were selected was four years old and, according to Chinese standards, reared the litter fairly well. It must, however, be emphasised that these weaners were at eight weeks only one-third of the weight of average European breed weaners and the characteristic of "good milkers" attributed to Chinese sows would appear to need qualification.

Chinese weaner pigs are invariably active and healthy, but owing to the lower mature weights of these pigs the young animals from birth to maturity are small when based on European standards.

At the termination of the experiment the pigs in Group A had comparatively straight backs while those in Group B had curved sunken backs, furthermore they had distended abdomens owing to their rations containing so much succulent vegetable matter. These characteristics show evidence of an adequate mineral supply in the rations fed to Group A and a deficiency in the rations of Group B.

Four pigs used in this experiment fed on a Chinese small holding were estimated to have consumed (dry weight) 789 lbs of B1 ration (unbalanced ration) costing $13.38, and 1,011 lbs. of B2 ration (unbalanced) costing $9.38, or a total of 1800 lbs. of food costing $22.76.

At the termination of the experiment these pigs weighed 210 lbs. (52 lbs. each), valued at 12.75 cents per lb., live-weight a total value of $26.77, or an excess of $1 per animal over the cost of food.

The four pigs fed on balanced ration at Serdang consumed 575 lbs. of ration A1 (balanced) and 919 lbs. of ration A2 (balanced), a total of 1,494 lbs. (dry weight), costing $34.58.

At the end of the experiment the four pigs at Serdang weighed 385 lbs., (96 lbs. per pig). Using the same standard market value as for the pigs fed on unbalanced ration (12.75 cents. per lb. live-weight) the total value of these pigs was $49.09, or an excess of $3.63 per animal over cost of food.

While, for the purposes of comparison the value per lb. for the pigs fed at Serdang is calculated to be the same as those fed on a small holding, owing to the firmness and texture of the pork the carcases of the pigs fed at Serdang were valued by Chinese butchers at 2 cents per kati (1 1/3 lb.) higher than those fed on the small holding.

References.

Kellner Prof. O. "Scientific Feeding of Animals."

Marsh, T. D. & Kanagaratnam, N. "Pig Husbandry & Preliminary Feeding Trials at the Stock Farm, Serdang," *Malayan Agricultural Journal*, Vol. XXVI, p. 94.

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THE EFFECT OF LALANG GRASS (*IMPERATA ARUNDINACEA*) ON GROWTH OF COCONUT PALMS

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The opinion has long been held that strong growth of lalang grass had an adverse effect on the growth of rubber trees and coconut palms, but prior to the experiment here described no comparative examination had been undertaken to measure this effect or to ascertain the cause.

Experiments were commenced in October 1931 at the Central Experiment Station, Serdang, with plots planted in rubber, and at the Coconut Experiment Station, Port Swettenham, with plots planted in rubber and dwarf coconuts.

Three types of cultivation treatment were given in each experiment—(a) lalang retained, (b) lalang removed and leguminous creeping cover (*Centrosema pubescens*) planted, (c) lalang removed and clean weeded. In the lalang plots a clean circle of four feet in diameter was maintained by periodic light cultivation round each palm and the lalang itself was scythed once in 6 months. In other plots the removal of the lalang was accomplished by digging and forking to a depth of six inches.

An important point which was overlooked in the design of the experiments was that the removal of the lalang for the clean weeded and for the cover crop plots introduced the factor of cultivation of these plots and not of the lalang plots. These lalang plots should also have been treated in the same way but without removal of the roots of the lalang which would then have very quickly re-established itself. This is the more important as the land had not been cultivated for a very long time and is, at Port Swettenham, of a particularly stiff clay.

Officers of the Rubber Research Institute have been concerned with the records of the experiments with rubber trees, a summary of which will be published in the Journal of that Institute. This article deals with the experiment planted with dwarf coconut palms at the Coconut Experiment Station, Port Swettenham.

The land in the neighbourhood of the Coconut Experiment Station is flat and low-lying and the soil is a stiff coastal clay with the water table varying around 30 inches from the surface. This area was originally cleared between 20 and 30 years ago, and has been planted with padi, sugar and tapioca, while for the last twelve years it has been allowed to remain under lalang. For a few years during this period the land was used by Sikh cattle owners for two small herds of milk buffaloes.

The experiment with dwarf coconut palms was commenced in January, 1932, and consisted in planting a block of 12 plots of 1/5 acre, with the three treatments replicated four times, with seedlings spaced 11 feet by 11 feet, so that there were approximately 70 young palms per plot. Each plot is surrounded by a three-foot drain.

Coconuts on Clean Weeded Area.

Coconuts on Cover Crop Area.

Coconuts in Lalang Area.

Unfortunately two varieties of dwarf coconut palm were planted—red and green —and there was variation in the dates of planting; in addition there has proved to be considerable difference in the fertility of the soil. In consequence, statistical analyses of figures cannot be made, but the results of the experiment are clearly recognisable.

The following is a diagramatic representation of the layout of the experiment:—

B 2 Cover Green	C 2 Clean Red	A 2 Lalang Red Green	B 4 Cover Green	C 4 Clean Red	A 4 Lalang Red
C 1 Clean. Green	A 1 Lalang. Red	B 1 Cover Red. Green	C 3 Clean Green	A 3 Lalang Red	B 3 Cover Red

Plots A1 and B1 are on the site of a former cattle shed and the soil is especially fertile. Plots B3 and A4 were planted much later. Plot A4, too, was affected severely by rat damage, and C1 by dry weather soon after planting.

It is of interest, also, to record in connexion with Plot A1, in lalang, that, in addition to this plot being on part of the old cattle shed site, during 1935 due probably to the fertility of the soil a strong growth of the wild passion fruit creeper and some *Centrosema pubescens* became established, in spite of the lalang, and was tending to suppress and kill out the lalang under the increasing top cover of the palms themselves. These creepers were removed in 1936 and the growth of lalang soon became stronger again, though it is not, even now, as dense in growth as the lalang of the other three plots.

In the very early stages of the experiment the lalang plots, except the one damaged by rats, showed the best growth and it is possible that the grass provided shade which was beneficial in dry spells and may, too, have prevented water-logging of the soil in wet weather. The clean weeded plots certainly suffered, in the early stages, from sun-baking of the soil. The cover crop plots showed progressive improvement in comparison with the other treatments.

There are, as has been indicated, several factors affecting uniformity of the plots and the most practical method of examining the effects of the three treatments is to compare growth measurements for all four plots of each, at succesive dates. Heights of palms are measurements to tip of tallest leaf in crown.

Date.	Treatment.	Averages of heights of palms in feet.				
		Plot 1.	Plot 2.	Plot 3.	Plot 4.	Mean
2.5.33	Lalang ...	5.8	4.1	4.1	2.0	4.0
	Clean ...	2.8	3.7	3.5	3.5	3.4
	Cover ...	4.7	3.3	3.1	3.1	3.5
2.3.34	Lalang ...	9.5	6.3	6.8	3.3	6.5
	Clean ...	5.0	7.1	7.1	6.0	6.3
	Cover ...	8.6	7.3	5.1	7.0	7.0
5.5.34	Lalang ...	10.2	6.9	7.9	4.0	7.2
	Clean ...	6.3	8.6	8.5	6.9	7.6
	Cover ...	10.2	8.4	6.5	8.3	8.3
18.5.38	Lalang ...	18.4	14.9	17.5	16.1	16.7
	Clean ...	19.7	18.0	20.7	17.6	19.0
	Cover ...	21.5	21.5	20.8	20.8	21.2

The following is a full summary of measurements of palms taken in May, 1938:—

Plot No.	Average height of palms in feet.	Average girths @ 12″ in inches.	Average girth @ 36″ in inches.	Average height of stem to axil of lowest leaf, in inches.
A1 ...	18	24	23	43
A2 ...	15	23	22	21
A3 ...	17	24	22	36
A4 ...	16	23	22	19
C1 ...	20	31	24	32
C2 ...	18	24	23	35
C3 ...	21	29	28	46
C4 ...	18	25	23	31
B1 ...	22	26	24	48
B2 ...	21	31	27	46
B3 ...	21	29	24	44
B4 ...	21	33	25	48
Averages				
Lalang (A) ...	17	23	22	31
Clean weeded (C) ...	19	27	24	36
Cover crop (B) ...	21	30	25	47

The yields of fruit have also been recorded. They are important records for coconuts, especially as fruit-production is not so closely correlated with girth and height measurements of stem as these are with yields of latex from rubber trees.

The following are the yields of fruit from January 1936, when the majority of the palms had commenced to bear, up to the end of April, 1938:—

Treatment.	Yields of fruits.				
	Plot 1	Plot 2	Plot 3	Plot 4	Total.
Lalang (A) ...	1255	82	698	8	2043
Clean (C) ...	334	506	502	490	2132
Cover (B) ...	1451	825	1189	674	4144

The total yields from the cover crop plots are obviously very much superior to either of the others. The total yields from lalang and from clean weeded plots appear, at first sight, to be very similar, but further analysis will show a difference.

Lalang plots A1 and A3 commenced at first to yield particularly well, especially A1 in, presumably, manured soil; but during 1937 both plots commenced a steady decline in yield in a manner which it is almost certain will be continued, and a continuation of yield records is expected to show the yields of the lalang plots to be much inferior to those even of the clean weeded plots.

A comparison of the total fruits obtained during the first and second halves of the above period will illustrate the nature of the decline in yields of the lalang plots.

	Jan. 1936-Feb., 1937.	March, 1937-April, 1938.	Total.
Lalang ...	1323 fruits	720 fruits	2043 fruits
Clean ...	749 „	1383 „	2132 „
Cover ...	1638 „	2506 „	4144 „

The comparatively high total of fruits taken from the lalang plots in 1936-37 is due to the excellent yield in 1936 of fruits from Plot A1, on the site of the cattle shed; but this plot deteriorated rapidly in 1937 after the growth of lalang had been allowed to become stronger.

The poor appearance of palms in the lalang plots is also very notable. There is very little difference in the appearance of the palms in the cover crop and in the clean weeded plots except that the palms in the former are slightly larger and the leaves are a darker green, whilst those in the latter are somewhat thinner in the crown. But there is no difficulty at all in recognising a difference between these palms and those in the lalang plots, which are, with the exception of palms in plot A1, much less well developed, and almost all show yellowing of the leaves.

An examination of the root systems of a number of palms in each of the three treatments revealed the fact that the development of surface feeding roots is much greater in the clean weeded and the cover crop plots than in the lalang plots

In the former, surface roots are found all over the plots to maximum distances from the palms, whilst in the latter, they are limited to the area within the cleaned circles, four feet in diameter, around each palm. This applies only to the surface roots of the palms, for lower-branching roots are fairly well developed in the soil below the main lalang root system, at a depth of about one foot.

The top-soil in the lalang plots is much stiffer than the top-soil of the other treatments, and this may be due, in part, to the different treatment in the initial stage of the experiment. It is by no means dry, even after a month with less than one inch of rainfall, so that excessive transpiration reducing soil moisture cannot be adduced as a cause of the poor development of the palm roots.

The stiff soil seems to be poorly aerated except in the passages formed by the lalang roots, which have not formed a dense system, even close to the surface.

Lalang will not grow in inundated land, nor strongly in heavily shaded land; but it occurs in open land that has been cleared, burned and/or neglected and it may be axiomatic to state that lalang is found well established in uncultivated land of which either the soil temperature was originally so high, or the standard of fertility had by other means been so greatly reduced, or the soil texture is so close, that most other plants are unable to compete successfully.

Soil Analyses.

Top soil and sub-soil samples were taken for analyses by means of augur borings in connexion with the experiments with rubber, but were not taken in the coconut area. The analytical determinations were those of pH (soil acidity), carbon, nitrogen, and conductivity as a possible rough index of total "available" soil nutrients. The figures obtained from these analyses showed large fluctuations and no reliable conclusions can be drawn from them. They show, however, that although the amount of nitrogen in the top soil varied considerably from time to time, the amounts for the lalang, cover crop and clean weeded plots were all very similar at the same times.

Conclusions.

The experiment could have been better designed and would probably have been more informative if treatments had included lalang cultivated and allowed to grow again, lalang frequently scythed, common lawn grass (*Paspalum conjugatum*) and natural growth of small shrubs, as well as the clean weeded, cover crop and untreated lalang plots that were used.

The results, however, may be regarded as having confirmed the widely held opinion that unchecked growth of lalang is injurious to coconut palms. This effect is probably governed in degree by the physical nature of the soil.

The poor development of the coconut palms in the lalang plots is probably due to a limited uptake of nitrates by reason of the restricted development of the surface feeding roots, apparently caused by some inhibiting effect of the lalang, and intensified, possibly, by the stiff close nature of the soil.

It is known that some plants when grown together have a mutually beneficial effect; but there are many more instances of competition between plants for soil nutrients and for light, and those succeed which, in their requirements, and in

habit, are better adapted to their environment; root "antagonism" is one means by which the more vigorously growing plant is able to suppress the weaker.

In the present instance the lalang appears to be much better adapted to existing natural conditions than do the coconut palms; but it has not been determined whether or to what extent the growth of the surface roots of the young coconut palms is inhibited by the purely physical condition of the soil, inadequate aeration, vigour of growth and competition for soil nutrients, or the formation of a toxic substance on the part of the lalang roots. It is possible that all four reasons may have some bearing on the result.

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THE GIANT SNAIL (*ACHATINA FULICA* FER.)

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TWO CONTAINERS FOR MIXTURES.

"Meta" fuel, a proprietary compound metaldehyde, when mixed with rice bran has undoubtedly proved very successful in killing snails and slugs; indeed, the results obtained from its use are most spectacular. The meta mixture is, however, apt to prove expensive as it is readily washed away by rain and is said to be poisonous to poultry and some other animals. These disadvantages may be overcome by covering the mixture with tiles, but the writer in his investigations of *Achatina* has found a cigarette tin and a mushroom type of container more satisfactory.

The Cigarette Tin Container. (Fig. 1).

The cigarette tin container based on the design of pill-boxes for ant poisons by Cotton and Ellington* consists of an ordinary 50—cigarette tin measuring about 3 inches in height and $2\frac{5}{8}$ inches in diameter. The top is divided into eight equal sections (*i.e.* each is just over 1 inch in width) by making cuts from the rim to a depth of about $1\frac{3}{8}$ inches. Alternate sections are bent downwards and inwards to provide a smooth surface and the four erect sections are bent slightly outwards to make the lid fit tightly. The tin may be secured to the ground by driving a nail through its base or by driving four sticks placed at equal distances around its base. When the lid is in place the sections are about 1 inch square. The sections should not be larger and the tins should not contain more than 1oz. of mixture, otherwise poultry will be able to reach it. There is a gradual reduction of the mixture owing to small snails and slugs having to be removed from the tins and to larger snails, which crawl up the sides of the tin and stretch their bodies through the sectional holes, having fed upon it. A cigarette tin of the above design, containing only 1 oz. of bran-meta mixture, has been responsible for the death of 41 snails in one night and of 93 snails throughout a period of two months. A bran-meta mixture will, therefore, prove effective throughout a long period, and will require to be replaced only when the receptacle is empty.

The Mushroom Container. (Fig. II).

The cost of the cigarette tin container is negligible, but the mushroom type may be prohibitive for estate work. The type, as illustrated, was made from tin sheeting for 30 cents by a Chinese tin-smith. A reduction would undoubtedly be made for a large order. As illustrated, this type consists of two parts, the container (A) and mushroom (B). The container is $3\frac{1}{2}$ inches in diameter and

* Cotton, R. R. and Ellington, J. W., "A simple and effective ant trap for household use" *Journal Economic Entomology*, Vol. 23, pp. 463—464.

THE CIGARETTE TIN CONTAINER.

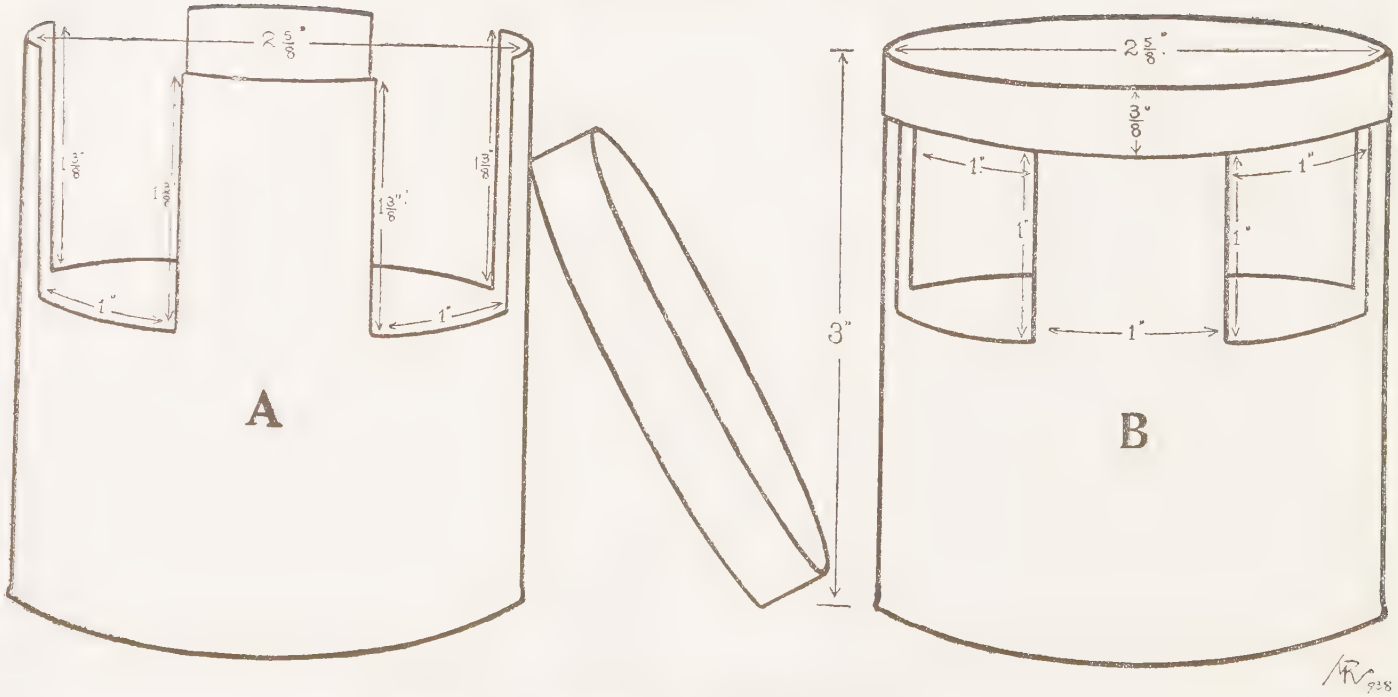

FIGURE I.—A. A Cigarette Tin Illustrating Sections.

B. Assembled for use.

THE MUSHROOM CONTAINER.

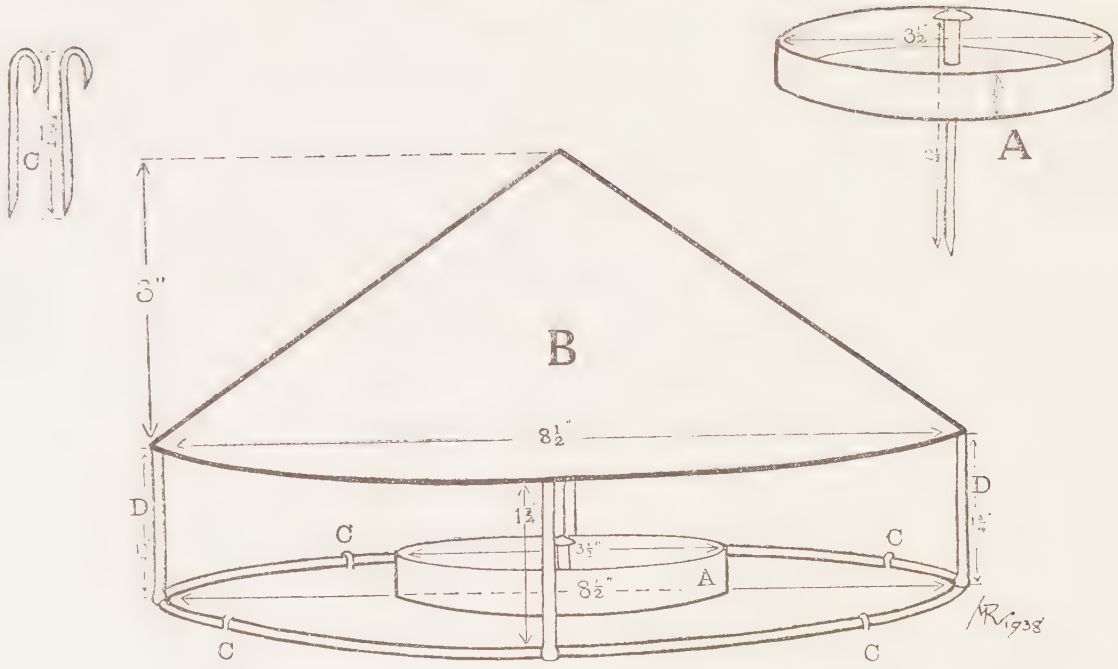

FIGURE II.—A. Container, B. Mushroom, C. Hooks, D. Stays.

$\frac{1}{2}$ inch in height and has at its centre a piece of circular tubing through which a nail is passed to fix it to the ground. This container is designed to contain 1 oz. of bran-meta mixture.

The mushroom part, which is soldered to a wire frame, is placed centrally over the container, the diameter of the mushroom and frame being $8\frac{1}{2}$ inches. The four stays (D) holding the mushroom to the frame are $1\frac{3}{4}$ inches in length, thereby allowing just enough space for the entry of larger snails. The apex of the mushroom from its base is 3 inches and the frame is held to the ground by four hook-like pointed wire rods(C). This type of container has proved successful in catching snails and in protecting and in preventing poultry consuming the mixtures.

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FIFTEENTH MALAYAN EXHIBITION.

The fifteenth annual Malayan Exhibition, organized by the Malayan Agri-Horticultural Association, took place on the Association's premises at Kuala Lumpur on July 30th and 31st and August 1st, 1938.

The organizers were fortunate to enjoy fine weather throughout the period, a fact which was partly responsible for the increased attendance. The official figures show that 30,907 persons paid for admission and 15,772 secured admission on members' and free passes, a total attendance of 46,679 as compared with 35,378 in 1937.

Opening Ceremony.

The Exhibition was opened by His Excellency the Governor and High Commissioner, Sir Shenton Thomas, G.C.M.G., O.B.E., in the presence of a distinguished gathering which included His Highness the Sultan of Selangor and His Highness the Yang di-Pertuan Besar of Negri Sembilan.

In asking His Excellency to open the Exhibition, Mr. F. W. Douglas, President of the Association since its inception, took the opportunity to tender the thanks of the Association to the many willing helpers who made the success of the Exhibition assured. He referred in particular to the value of the Village Industries Section and to the initiative of H.H. the Sultan of Selangor who had organized a stall showing the village handicrafts in his State. The speaker than urged for consideration of the economic position of the villagers by greater control of money-lenders.

In declaring the Exhibition open, His Excellency said:—

> "It is a great pleasure to me to open once again this Exhibition of the Malayan Agri-Horticultural Association, the fifteenth of its kind. In past years I have tried to speak to you on some of the problems with which agriculture in Malaya is confronted, but to-day I propose to depart from that practice, partly because the future is so obscure and partly because I feel that the Exhibition itself deserves more than a few words of mention.
>
> I am glad to say that all the stall space has been taken up. Four important firms exhibit for the first time, and others who were not represented last year have now returned. I am sure this is wise. I am told that last year one firm sold $18,000 worth of goods at this Exhibition.
>
> H.H. the Sultan of Selangor has provided for a stall at his own expense in order that you may be able to see, and to buy, the products of some of the villages of his State.
>
> It is a great pleasure to me to see this further proof of His Highness's enthusiasm for the welfare of his people.
>
> Indeed, village industries are particularly well represented this year and you will find contributions from every State save Perlis and Brunei. You will find also exhibits from all the trade schools, and most interesting they are. An oil crushing machine at work is being shown by the Agricultural Department, and although the Rubber Research Institute are not exhibiting, their own offices are so near that everyone can go and see the work that is being done.

We welcome the appearance of live stock once more after an enforced absence of four years due to the prevalence of foot and mouth disease. There is as usual a health, maternity and child welfare section, an art stall, cinematograph films (including some by amateurs), a fine show of flowers and vegetables, including many from Cameron Highlands, where development is making rapid headway, and an all-Malayan padi competition.

There is another feature which I suggest that you should not overlook. That is a demonstration of top-spinning. It might be thought that this is not a sufficiently adult pastime to be worthy of inclusion in the Exhibition, but I have seen the Malays spinning their tops in Kelantan and I can assure you that it is not child's play.

The products of Malaya, displayed annually here in Kuala Lumpur are, as you know, being brought this year before a large public at the Empire Exhibition at Glasgow. Some photographs of the Malayan section can be seen here to-day and we are grateful to the organizers for the care and ability with which they have represented Malaya in Great Britain.

The Exhibition at Glasgow is enabling many people who have never been to Malaya to form some idea of what this country is like. What they see at Glasgow will undoubtedly be more true to life than the things they read about the East in most novels or see in films. It may be that it will encourage them to visit us.

In the same way our Exhibition in Kuala Lumpur gives a chance to people who have not the opportunity of travelling to see what other parts of this country are like. The Exhibition is really representative of Malaya. It contains much of the best that is to be found in the Malay States, and here one can see in a day what would take many weeks to discover and study in the places from which the exhibits come.

Mr. Douglas has spoken of the need of assistance to the peasant. It is one of the main purposes of this Association to encourage the agriculture of small holders. They have their own problems and many of these are incapable of solution by individuals alone.

It is, therefore, pleasant to know that small agriculturists are combining together in co-operative societies and are by their own efforts building up organisations which will ensure their economic independence.

It has long been the policy of Their Highnesses the Rulers of these States to encourage the planting of padi and food crops and the wisdom of that advice was never more clear than now. One of the obstacles to progress amongst padi planters has been the difficulty of organising a system of finance, which will support the planter during the long period between planting and harvest. It is very encouraging to see that this problem seems to have found satisfactory solution in the formation of Seasonal Co-operative Credit Societies and I hope they will receive widespread support.

Better agriculture depends upon better business and nowhere can a small-holder learn better business than in his Co-operative Society. In the local organisation of the small-holder lies the best hope of the progress of small scale agriculture in the Malay States. I regard the co-operative movement in general as of the very greatest importance to the welfare of this country.

And now before I close I must touch on one other matter. This is the first opportunity that I have had to express publicly my appreciation of the way in which the planters of Malaya as a whole have faced the labour problem which has arisen during the last few months by reason of the cut in the rubber quota.

They have co-operated with the Government in suggesting schemes for unemployment relief, they have arranged the work on their estates so as to throw the fewest possible labourers out of work, and they have refrained from successive reductions of wages as the cut in the quota increased. By so doing, they have made a notable contribution to the peace and happiness of Malaya, and I thank them.

Such consideration for labour is bound to improve the already good relations between employers and employed. The best that I can wish for them is that better times may come soon—sooner perhaps than some expect—so that then they may reap the reward of their wisdom and forbearance.

In declaring this Exhibition open, I thank on your behalf all those who have worked so hard to make it a success, and especially the ladies who are taking part in greater numbers than ever and have vested even the most unpicturesque exhibits with some attractiveness."

Competitive Sections.

All-Malayan Padi Competition.

For the fifth successive year the competition for padi was organized on a Malayan basis. Competitors first exhibit their padi either at District Agricultural Shows or local Padi Competitions. Prize-winners' exhibits then compete in State shows, and the best of these exhibits are then sent to the All-Malayan Padi Competition.

This year the classes were rearranged so that instead of giving a prize for the best padi, the competition was divided into three groups—long, medium and short grain.

The quality of exhibits was little different to that of last year, while the rearrangement of classes greatly facilitated the work of the judges who were called upon to perform the difficult task of selecting the best sample from so many excellent exhibits.

All-Malayan Small-Holders' Rubber Competition.

Exhibits in this competition—which is organized on lines very similar to the padi competition—were confined to rubber smoked sheet. The response this year was greater than in previous years. Five prizes went to Pahang, one to Johore and one to Perak. The superiority of the Pahang samples is not without significance, for in this State rubber dealers have given considerable support by price discrimination, to efforts directed to induce small-holders to produce improved smoked sheet rubber.

Agricultural Section.

The policy of the Committee responsible for this Section has been for the past two years, to insist on no late entries and somewhat ruthlessly to reject all exhibits which, in their opinion, are not up to the standard demanded of an exhibition organized on a Malayan basis. The result was that fewer exhibits were received thus allowing more space for display, the standard of quality improved, and generally, the Show has gained in dignity. Perhaps the most noticeable

feature was the increase in the number and a wider range of products prepared for market—such as locally bottled or canned fruits, preserves and pickles, tea—both black and green for sale in bulk or in packets—prepared tobacco, cigars, soap and so on. The total exhibits in this section exceeded 3,000 and the close attention which visitors gave to the exhibits was proof that they were interesting and instructively displayed.

Amongst exhibits of vegetables, mention should be made of the attractive display of vegetables from Cameron Highlands.

Horticulture.

The Horticultural Show demanded considerably larger space than last year. The arrangement of the Show was pleasing and enabled individual exhibitors to show their plants and flowers to advantage. Perhaps the most attractive exhibits were the orchids, while the increase in range of English flowers grown in the lowlands was noticeable. A group of flowers from Fraser's Hill demonstrated the possibility of increasing the commercial production of flowers from this easily accessible Station.

Poultry.

The most striking feature of the Poultry Show was the number of pure bred Rhode Island Red cockerels exhibited by small-holders and the care with which they had been prepared for the Show. One pure bred Rhode Island Red in the Kampong Section attracted attention, and when the owner was asked from where he had obtained it he said he had bought one egg from the Department of Agriculture for 25 cents—this prize bird was the result.

The entries were more numerous than in previous years and the judges were satisfied that the general quality of the exhibits continues yearly to show an improvement.

Live Stock.

Owing to foot and mouth disease, it has not been possible to hold a Cattle Show for the past few years. The re-appearance of Sections for Cattle and Goats was therefore particularly welcome this year.

The Cattle Section was divided into 7 classes; 5 of which were for bulls and 2 classes for cows.

Cows were judged on their general conformation combined with their milk yields taken over a period of 24 hours.

The Goat Section consisted of 2 classes.

The exhibits were not numerous in either Section, but considerable interest was evinced in the Sections and there is little doubt that competition will be keener and the exhibits more numerous next year.

Pig Show.

Owing to quarantine restrictions, it was not possible to hold a show of pigs in the Exhibitions of 1936 and 1937. It was difficult after this lapse of years to get in touch with pig breeders, consequently the number of exhibits was less than in former years. This Section also suffered this year from the fact that the Department of Agriculture was unable to send exhibits, as the Government herd is undergoing reconstruction. In all previous years, the exhibits from the Government Farm were the finest in the Show and were the centre of interest. Their animals also formed a basis for the comparison of other exhibits and were of a high educational value.

Apart from this disappointment there were some fine exhibits in the pure bred classes, but the support given to the cross breed classes was not up to the standard of past years, either in number of entries or in quality.

The total number of competing entries was 22 as compared with 35 in 1935.

Cat Show.

As usual the Cat Show was held on the last day of the Exhibition. The entries were not numerous, but the remarkably high standard of the animals exhibited compensated for this numerical deficiency. The splendid specimens of Siamese and Persian cats were a prominent feature of the Section. Buyers of kittens were numerous despite the high prices demanded by their owners.

Arts and Crafts.

Village Industries.

The Village Industries Section has grown enormously and this year in spite of much enlarged accommodation in a specially erected building, the space allotted proved insufficient.

This Section is now divided into two parts, the competitive classes which for a number of years have attracted the best individual examples of certain village crafts from many parts of the country and the State Stalls which exhibit for sale specialist craft products of their State which in many cases have benefited by the assistance and advice of the local branch of the Malay Arts and Crafts Society.

Over 3,000 exhibits were received in the competitive classes from Penang, Province Wellesley, Perak, Selangor, Negri Sembilan, Malacca and Trengganu. Most of the exhibits were for sale and the amount realised—$400—for the benefit of exhibitors, was a record.

The extent to which the competitive part of the section is now overshadowed by State Stalls may be gauged from the fact that the cash sales, exclusive of orders, at the Selangor, Kelantan, Trengganu, Port Dickson and Kedah Stalls and at the Stall of the Sultan Idris Training College, Tanjong Malim, exceeded $5,000. The Stall of the Singapore Malay Union, represented for the first time, also did brisk business.

These State Stalls included for the first time a number of craftsmen and women at work weaving, making silver, pottery, fibre mats, baskets, walking sticks and giving demonstrations of how 'batek' is made and of the new Yuzen process of colour stencilling on silk. It is hoped that this feature, which attracted much interest, can be further developed next year.

The Governor's cup was awarded to the Kelantan Stall for an outstandingly attractive and interesting display.

School Industries.

School industries were well represented and showed the very great attention which is now paid in both boys' and girls' schools to arts and crafts. Many of the most important schools had their own stalls.

A feature of great interest were the separate groups of exhibits staged by the five trade schools of Penang, Kuala Lumpur, Johore, Malacca and Singapore. The articles on exhibition included working models of electrically driven engines, tailoring and carpentry, while craftsmen were seen at work.

A Silver Medal was awarded to the Penang Trade School for the best exhibit in this Section. Sales of furniture from the Malacca and Johore stalls were brisk.

Needlework and Handwork.

The Needlework and Handwork Section, which this year was confined to hand made articles, received a very satisfactory number of entries, about 350 pieces of work being submitted. Mention is made of the large entry of Malay gold embroidery, the high standard of smocking, and the excellence of the coloured embroidery on linen.

Arts and Photography.

The 1938 Arts and Photography exhibition proved the largest on record—439 pictures having been shown as compared with 223, 262 and 272 in the three preceding years.

The standard on the whole was good for amateur work, and that of the photography group, especially among the Chinese, quite exceptionally high. The weakest section was that for the oil-paintings, which, with the exception of two or three exhibitors' work, was poor.

In spite of the large number of good entries, sales were very small, owing undoubtedly to the fact that water colours and photography were too highly priced by their owners.

Departmental Exhibits.

The Department of Agriculture, in addition to staging the All-Malayan Small-Holders' Padi Competition and the Oils and Fats Section, demonstrated in a specially-erected building the use of a hand press for the extraction of palm oil.

The Rubber Research Institute of Malaya organized the All-Malayan Small-Holders' Rubber Competition Visitors were invited to the Institute, which is situated near the Exhibition, to view the premises and the nature of the investigations in hand.

The F.M.S. Railways showed a working model of the interlocked signalling system. Members of the staff explained the working of the system and were available to answer enquiries regarding transport or to book tickets.

The Fisheries Department at a special stall showed, amongst other interesting exhibits, the various kinds of fish, sea corals, and fish traps used locally.

The Medical Department in their permanent building, staged instructional exhibits and demonstrations regarding infant welfare, malarial work and general sanitation.

For the first time the Malay Regiment, stationed at Port Dickson, was represented by a stall, decorated with the regimental colours. N.C.O.'s and men of the Regiment were on duty at the stall distributing literature and giving information about service in the Regiment.

The Trade Section was, as usual, staged in the main building of the Exhibition. The space allotted to the Section was fully occupied by stands.

The Y.W.C.A. again provided a rest-room for women which was much appreciated, and a post office provided the usual efficient service.

Entertainments.

A varied programme of entertainments was provided and was enthusiastically supported by visitors. The entertainments included a cycling carnival, Selangor Boy Scouts' Association Display, Malay top spinning matches, Wayang Kulit, a Bangsawan, Film Propaganda, the new amateur Cine Film Competition winning exhibits, "Retreat" beaten at the Stadium by the Drums of the Malay Regiment which drew a large crowd, and on the last evening a very popular anti-aircraft demonstration at the Stadium by B Company Selangor Battalion F.M.S.V.F., the "bombardment" of the village defended by this Company being undertaken by aeroplanes of the Kuala Lumpur Flying Club.

D.H.G.

THE ALL-MALAYAN PADI COMPETITION, 1938.

The All-Malayan Padi Competition was carried through for the fifth consecutive year, the final stage being held in conjunction with the Agriculture Section of the Fifteenth Malayan Exhibition organised by the Malayan Agri-Horticultural Association in Kuala Lumpur on 30th July to 1st August. Judging of the exhibits was completed the day before the opening of the Exhibition.

District and State shows had been held at various centres during the two or three months preceding the Exhibition as shown in the following table:—

	Local or Mukim Padi Competitions.	District Shows.	State Shows.
Penang ...	—	1	—
Kelantan ...	—	5	—
Province Wellesley ...	—	3	1
Perak ...	41	15	1
Selangor ...	10	4	—
Pahang ...	46	5	1
Negri Sembilan ...	9	3	—
Malacca ...	17	3	—
Kelantan ...	—	5	—

The number of exhibits received from each of these States and Settlements for the central competition was as follows:—Penang and Province Wellesley 15 (12), Perak 33 (43), Selangor 18 (17), Pahang 13 (14), Negri Sembilan 15 (12), Malacca 12 (11), Kelantan 3 (3), total 109 (112). The figures in brackets are for 1937.

The general standard of padi was fairly high but not so high as for last year. This may be accounted for by the fact that the season, particularly in the north of the Peninsula, has not been too good, owing to drought at nursery time. This especially affected the varieties of long maturation period which had already been sown when the dry spell set in and which it was not possible to transplant until they had been an exceptionally long time in nursery beds.

Penang and Province Wellesley were most seriously affected by this drought and in consequence exhibits from this area were particularly disappointing.

Exhibits from Selangor, with its scattered and/or young padi areas, were, as usual, below average in quality but showed, if anything, a slight improvement.

Pahang, Negri Sembilan and Malacca were all very even in standard with varied ranges of good exhibits of Siam, Radin and Seraup types.

Kelantan sent in three exhibits of very good appearance but which were not quite up to prize-winning standard.

Perak as usual had the largest number of entries and were awarded the challenge shield on account of the even standard and high quality of a number of Radin exhibits from Kuala Kangsar District. The expected numbers and quality of Seraup exhibits from Krian were lacking, largely owing to the difficult season which favoured shorter term varieties.

The method of awarding prizes was altered. First and second prizes were given in four different classes as follows:—Long grain types, (Siam, Sakepol etc), Medium grain types (Seraup, Sabatil etc.), Medium grain types (Radin Kuning, Reyong, etc.) and Short grain types (Milek, Serendah etc.).

Prizes were awarded as follows:—

Siam type	—	1st prize for Siam 29 from Rembia, Malacca, and 2nd prize for Siam 29 from Johol, Negri Sembilan.
Seraup type	—	Both prizes for local Seraup from Labu, Negri Sembilan.
Medium type	—	1st. prize for Radin Kuning (R.2) from Kuala Kangsar, and 2nd prize for Radin Kuning from Kuala Lipis, Pahang.
Short type	—	1st prize for Radin Merah (R.4) from Kuala Kangsar, and 2nd prize for Milek Kuning 3 from Bentong, Pahang.

Judging was made on purity and cleanness of sample, degree and uniformity of ripeness, and condition and uniformity of grain. Type of grain was also considered; approved types included those of wide popularity for yields and quality of rice, with well filled grain and of reasonable size.

R.B.J.

Received for publication 1st. September, 1938.

Reviews.

Annual Report of the Drainage and Irrigation Department of the Malay States and the Straits Settlements for the year 1937.

By A. G. Robinson, B.Sc. (Eng.), M. Inst. C.E., Director, Drainage and Irrigation, Malay States. F.M.S. Government Printing Press, Kuala Lumpur, 157 pp. 61 illustrations, 32 maps and plans. Price $1 or 2s. 4d.

The 1936 Report of the Drainage and Irrigation Department was reviewed at some length in *The Malayan Agricultural Journal* last year, when the reviewer commended it as a comprehensive survey of the progress made to-date in drainage and irrigation in Malaya. The present report is equally comprehensive, and carries the account of progress to the end of 1937.

The Report is of particular interest to agriculturists and miners, but certain aspects of the work of the Department must also appeal to municipal bodies, and the Medical profession, especially Chapters X and XI, which deal respectively with conservancy of rivers, and silting of rivers from soil erosion.

In this place we are particularly concerned with the agricultural aspect of the work of the Department. The work of the Drainage and Irrigation Department is, of course, well known to officers of the Department of Agriculture, and the Field Officers of the latter Department are in constant touch and collaboration with the former Department.

The task of improving land for agricultural purposes has made steady progress during the six years that the Drainage and Irrigation Department has been in existence. The work appears to fall under two heads—improving existing agricultural areas, and making available new areas for agricultural purposes. In the former category may be included the numerous schemes, both large and small, for improving irrigation and drainage, while in the latter are included the more ambitious schemes of opening up extensive tracts of land especially for padi cultivation. In the former, results are apparent at an early date after completion of the work, and as an instance of such success may be mentioned the draining and bunding in the Sabak Bernam peninsula of Selangor which has resulted in a spectacular improvement of the considerable area of coconut palms in this area.

The bringing to fruition of new schemes of irrigation demands patience as well as the skill of the engineer. Considerable progress has been made in opening up new areas for agricultural purposes, and it is evident from this Report that the work of the engineer is reasonably in advance of colonization, for it is noticed that in connexion with four of the principal schemes, some 15,000 acres are ready for cultivation, but have not yet been alienated to cultivators.

The duties of the Department under review are not concerned solely with the special service of inaugurating schemes of drainage and irrigation, but include the equally important duty of maintaining such works in an efficient state. Mr. Robinson appreciates the paramount importance of this aspect of his problem for he writes:—

> "Nor does the work of the department end with the completion of a drainage and irrigation scheme. The department must see that the economic results from the schemes are brought to fruition. This is a long and laborious process necessitating on the part of the officer concerned, a knowledge of the people, their language and their customs, and initiative and continuity of effort are essential."

Malayan Rubber Statistics Handbook 1938.

Compiled by the Department of Statistics, S.S. and F.M.S. Published at the Government Printing Office, Singapore. To be purchased direct from the Government Printing Office, Singapore, or from Kelly and Walsh Ltd., Raffles Place, Singapore, 118 pp. 1 graph. Price $1.50 (Straits currency) or 3s. 6d.

This annual compilation of statistics concerning the Malayan rubber producing industry gives, in 88 Tables, all the available statistics of Malayan acreage, production, imports, exports and consumption of rubber up to the end of the year 1937.

The book is divided into nine Sections. The first—and most important—Section, in 20 Tables deals with the subject from a Malayan point of view, and includes tables of total planted area, tappable area, budgrafting, tappable area not tapped, nationality of ownership, local consumption, foreign imports and exports, domestic exports, stocks and average Singapore prices since 1933. Subsequent sections are concerned with the rubber statistics of the Straits Settlements, Federated Malay States, and each of the Unfederated Malay States.

Obviously, the book is a work of reference, but an essential publication for those who wish to be placed in possession of authoritative statistics on this subject.

Report of the Working of Rubber Regulation in Malaya during 1937.

Published by the Federated Malay States Press, Kuala Lumpur, as Paper No. 36 of 1938. 35 pp. Price $1 post free in Malaya.

The position of Malaya in the International Rubber Regulation Agreement, and the working of the scheme in this country during 1937 are detailed in this publication, which is supported by statistical information for the year under review. It is understood that only a limited number of copies of this Report are available for sale.

Departmental.

FROM THE DISTRICTS.

The Weather.

The intensely dry period which had been general in all parts of the country came to an end in August.

In Kedah the weather was cold and very heavy rainfall occurred. The average for all districts was over 10 inches. There were frequent violent westerly gales along the coast. In Penang and Province Wellesley similar conditions prevailed and flooding occurred in some parts.

At Bendang Kroh in South Perak a violent gale blew down III houses.

In other parts of the country such extreme wet weather has not been the rule. In Perak and in the northern parts of Pahang and Kelantan the weather remained dry until the second half of the month when thunderstorms and showers occurred bring the rainfall for the month up to normal. In the south and eastern part of Pahang the weather remained rather dry until the end of the month.

Selangor experienced frequent heavy showers but water supplies in some of the northern districts are still reported to be short. The precipitation in Negri Sembilan was higher than normal.

In Johore the second half of the month was wet and cool, but in only a few places was the rainfall in excess of the average. Ample rain fell in Singapore.

Remarks on Crops.

Rubber.—The price of rubber showed a steady appreciation throughout the month, closing at an average price of $34 per picul for good quality smoked sheet. Export rights also increased in value to $25 per picul. There has been an increase in tapping in some areas, though this is not so apparent in padi planting districts where work in the rice fields is still in progress.

The interest in new planting rights had, at the beginning of the month, slackened somewhat and not more than 75 or 80 cents per unit was being paid. When it became known that Government would entertain applications for State land for planting rubber, there was an immediate renewal of interest, and the price hardened to $1.20. Many applications for State land are being dealt with in all parts; and applications are also being received for the conversion to rubber of conditions attaching to land originally alienated for other crops.

The grading scheme which has recently been inaugurated in Perak is apparently already having a good effect, and dealers in Krian report that small holders are producing better sheet.

Padi.—In the west coast areas planting is well advanced. The rain enabled good progress to be made though flooding in Penang and the Province did some damage to nurseries. In Pahang, where dry weather had previously held up planting operations, rains enabled a start to be made in all districts.

The wholesale price of padi in Kedah and Province Wellesley increased appreciably. At the Government Rice Mill in Krian $2.10 per picul is still being paid: very little business, however, is now being done.

Rats do not yet appear to be numerous and the number killed in organized hunts has been small. It is probable that the prolonged dry weather and subsequent heavy rain caused a large reduction of the rat population.

Coconuts.—In Province Wellesley large crops of nuts have been harvested. Yields, however, are now commencing to diminish.

The price of copra generally tended to depreciate somewhat.

Derris.—For some months demand has been slack in this market and prices low. In Singapore there is a steady demand for good quality derris of a high rotenone content to meet American requirements which favour this type of root. There has been little demand previously for the Kinta type root (of which the rotenone content is low) and local Perak dealers have dropped out of the business; growers, therefore, being unable to sell their crops, experienced some hardship. There is now, however, a small demand for this root in Sumatra and elsewhere and dealers are again buying fair quantities.

Tobacco.—The advent of the wet weather has seen an increase in the planting of this crop. In Kedah and Perak tobacco has long been an important minor crop and large new areas are now being opened up. Several hundred acres are annually planted in Kelantan. The growing of tobacco on anything but a very small scale is quite a recent departure in Malacca. Chinese growers are now taking it up and considerable areas are being developed. This year in Malacca stem borers, which are probably the worst pest of tobacco in other parts of the country, have made their appearance as a serious pest for the first time.

The locally grown leaf is usually sold, either cured or in a fresh state, to dealers who manufacture it into cheroots, often mixing it with imported leaf of a better quality. Growers themselves manufacture and sell a certain quantity of shag tobacco.

Sakai Reserve Plots.

A certain amount of success is attending the settlement of Sakai on the land at Anak Ayer Denak and Langkap in Perak. The small-holders plant wet and dry padi, maize and vegetables. Frequent supervision is, however, necessary as otherwise the plots soon become neglected. Most of these Sakai, who are of the Batin people, work well with instruction; but they are of a somewhat poor type and left to themselves they show no initiative and soon lose interest.

DEPARTMENTAL NOTES.

Term Commences at the School of Agriculture, Malaya.

The second term of the current session commenced on 18th August and will end on 21st October. This comparatively short term can hardly be avoided as experience has proved the inadvisability of keeping students at the School during the Mohammedan fasting month. A corresponding longer period will therefore be allotted to the third term which will extend from the end of November until the middle of April next.

There are 60 boys in training at present, of whom 43 are taking the Two Years' and 17 the One Years' (Vernacular) Course. Eighteen students (5 Malays, 11 Chinese, 1 Indian and 1 Dutch Burgher) will be leaving the School next April on completion of the two years' course of training.

Three or four Old Boys (Chinese) have not yet found suitable employment and the Principal would be glad to hear of any vacancies on estates for which they might be considered.

Visit of the Director, Rubber Research Institute of Malaya, to Brunei and Labuan.

The Agricultural Officer, Brunei and Labuan, reports that the Director, Rubber Research Institute of Malaya, visited Brunei between 10th and 15th August and Labuan on 16th August.

During his visit to Brunei samples of rubber sheet were brought in by small-holders for his inspection and great interest displayed on his comments. It is understood that the Director was impressed with the quality of some of the small-holders' smoked rubber, which he considered was of first quality.

In Labuan, the Director inspected many small holdings and attended a meeting of Malay small-holders at the Agricultural Station. Numerous questions regarding rubber growing and production were asked by the small-holders, and a demonstration of sheet rubber coagulation was given by the Asiatic Rubber Inspector.

Leave.

Mr. R. G. H. Wilshaw, Chemist (Soils), has been granted 274 days leave from 13th August 1938 to 13th May, 1939, both days inclusive.

Mr. H. T. Pagden, Entomologist, has been granted 215 days leave from 13th August 1938 to 15th March 1939 both days inclusive.

Mr. H. N. Sands, Agricultural Officer, returned from leave on 11th August, 1938.

Mr. J. N. Milsum, State Agricultural Officer, Perak, has been granted 288 days' leave from 31st August, 1938 to 14th June 1939 inclusive.

FERTILIZER PRICES, AUGUST, 1938.

The following are the prices at the end of August, 1938, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	72.75
Calcium Cyanamide ...	20.6	—	—	—	80.00
Muriate of Potash ...	—	—	—	50	112.00
Sulphate of Potash ...	—	—	—	48	112.00
Superphosphate (concentrated) ...	—	39 - 40	—	—	105.00
Superphosphate ...	—	16 - 18	—	—	60.00
Basic Slag ...	—	16	—	—	48.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

The above quotations for concentrated superphosphate, superphosphate and Christmas Island phosphate are *ex* warehouse Penang, Port Swettenham and Klang. The Singapore quotations for these three fertilizers are $95, $50 and $31.50 per ton respectively.

Statistical.

MARKET PRICES.

August, 1938.

Major Crops.

Rubber:—The price sagged a little during the first week, but thereafter showed a small but steady improvement. The lowest Singapore dealers' buying price for No. 1 X Rubber Smoked Sheet loose was 25⅝ cents per lb. on 5th, and the highest 27½ cents on 25th and 26th, the average price for the month being 26.56 cents per lb., as compared with 25.11 cents in August. The London average price was 7.85 pence per lb., and the New York price 16.01 cents gold per lb., as compared with 7.44 pence and 15.21 cents gold per lb. in the previous month.

Prices paid for small-holders' rubber at three centres during August are shown in Table I

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, August, 1938.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Pilah, Negri Sembilan			Kuala Kangsar, Perak		Batu Pahat, Johore.				
	4	18	25	10	17	3	10	17	24	31
Smoked Sheet	31.88	32.60	—	32.30	33.00	—	—	30.50	33.09	—
Unsmoked Sheet	31.00	—	32.00	—	—	29.70	28.50	29.50	24.32	31.09
Scrap	No purchases									

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.
Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.
Transport from Kuala Kangsar to Prai by railway $6.20 per ton.
Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).
At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.
At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.
No purchases at Kuala Kangsar on 3rd, 24th and 31st or at Kuala Pilah on 11th August.

Palm Oil:—Prices eased somewhat from those ruling in the previous month. The average weekly quotations in July were:—palm oil £14-11-0 per ton, kernels £8-17-6 per ton; prices for August are shown in the following Table.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1938.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
August 5	£ 14. 10. 0	£ 8. 10. 0
,, 12	14. 0. 0	8. 2. 6
,, 19	13. 15. 0	8. 10. 0
,, 26	14. 5. 0	8. 7. 6
Average August	£ 14. 2. 6	£ 8. 7. 6

Copra:—Prices in Singapore declined throughout the month from $3.65 per picul for sun-dried at the beginning of the month to $3.35 at the end of the month. The average price of this grade for August was $3.43 per picul as compared with $3.66 in the previous month. The mixed grade showed a corresponding decline, being quoted at 35 cents per picul less than sun-dried, the average price was $3.08 as compared with $3.32 in July.

Copra cake was quoted throughout the month at $2.10 per picul.

Rice:—The average Singapore wholesale market prices of rice per picul in July were as follows:—Siam No. 2 ordinary $4.39, Rangoon No. 1 $3.92, Saigon No. 1 $4.02, as compared with $4.25, $3.95, $3.87 respectively in June and $4.08, $3.55 and $3.72 respectively in July 1937.

The average retail prices in cents per gantang remain unchanged at Singapore 28, Penang 32 and Malacca 28.

The average declared trade value per picul of imports during July was $3.91 as compared with $3.88 in June 1938, and $3.78 in July 1937.

Padi.—In the main rice-growing districts the price of padi was between $8 and $9 per 100 gantangs, with an upward tendency. In districts more remote from centres of production the price varied from $8 to $14 per gantang.

Pineapples. Canned pineapples have been quoted throughout August at the following prices per case of 48 tins of 1½ lbs. each:—G.A.Q. Cubes $2.70, Sliced Flat $2.65, Sliced Tall $2.80; Golden Quality $2.90, $2.85 and $2.95 respectively.

The first season has now ended and all factories in Johore have closed down. Prices of fruit improved slightly in Singapore being 90 cents to $1.60 per 100 fruits at factory. Elsewhere prices continue low, in north Johore from $3 to $2 for first quality, $2.00 to $1.50 second quality and $1.20 to $1 third quality. In Selangor the price was from 40 to 70 cents per 100 fruits and in Negri Sembilan from $2 to $3 per 100 fruits.

Beverages.

Tea:—Four consignments comprising 384 packages of upland tea and 5 consignments comprising 360 packages of lowland tea were sold on the London market during August. The upland tea sold at prices between 1s. $1\frac{3}{4}$d. and 1s. $1\frac{1}{4}$d per lb., the average being 1s. 1. 44d. per lb., and the lowland between 1s. $0\frac{1}{2}$d. to 11d. per lb., the average quotation being 11.9d. per lb.

According to the Tea Brokers' Association of London Market Reports for August, the average London price per lb. realized during the month for consign-'ments of tea from other countries were as follows:—Ceylon 1s. 2.78d., Java 1s. 0.32d., Indian Northern 1s. 3.61d., Indian Southern 1s. 0.88d., Sumatra 10.99d.

The latest Colombo average prices available, quoted from *The Ceylon Tea Market Report* 30th August 1938, of the Ceylon Brokers' Association are as follows, in rupee cents per lb. High Grown Teas 85 cents, Medium Grown Teas 73 cents, Low Grown Tea 61 cents.

Coffee:—Palembang coffee in Singapore ranged throughout the month at $9 to $10 per picul, the price within this range depending upon quality. Sourabaya coffee was quoted throughout August at $11 to $12 per picul.

The price of Liberian coffee was $14.50 per picul and Robusta $6.00 per picul throughout the month. Excelsa rose 50 cents to $9.50, but dropped again to $9.00 per picul, the average price being $9.10 per picul.

Spices.

Arecanuts:—The range of Singapore market quotations for August were as follows per picul:—Splits $8.22 to $5.10; Red Whole $7.25 to $6.10; Sliced $9.37 to 8.19.

The averages of Singapore Chamber of Commerce quotations per picul were:—Best $7.62, Medium $7.01, Mixed $6.50 as compared with $7.32, $6.88 and $6.20 in July.

Pepper:—Prices were easier and the market neglected. Average Singapore prices per picul in August were:—Black $8.12\frac{1}{2}$, White $13.06, Muntok $13.31, as compared with $8.22, $13.65 and $13.90 respectively in July.

Nutmegs:—Prices tended to decline during August; the average price for the month for both 110's and 80's was $30.25 per picul, as compared with $28.60 in July.

Mace:—Siouw mace was quoted throughout August at $80 per picul as compared with an average price of $80.40 in July. Amboina was quoted during August at $62 per picul as compared with $63.20 per picul in July.

Cloves:—Nominal prices were again quoted throughout the month at $40 per picul in Singapore for both Zanzibar and Amboina cloves.

Cardamoms:—The latest available price for green cardamoms as given in The Ceylon Chamber of Commerce Weekly Report for 29th August, 1938, is from Rs. 1.00 to Rs. 1.11 per lb.

Miscellaneous.

Derris:—There was no demand in Singapore for derris sold on ether extract basis; prices for first grade rotenone varieties, however, were well maintained owing

to lack of supplies. Root sold on basis of ether extract was quoted at $14 per picul, and on the basis of rotenone content from $18 to $20 per picul.

A firm of insecticide manufacturers in New York, writing at the end of July, state that the season is coming to an end and any further purchases of derris for shipment from Singapore cannot arrive until after the agricultural season; therefore only desultory buying is likely until October/November. Shippers are offering Malayan root guaranteed to contain 5 per cent. rotenone at 6¾d. c.i.f. New York, and offerings from Java are on the same level, *i.e.* 14 cents c.i.f. New York. Cubé root is also slightly weaker, being freely offered at 9 cents c.i.f. New York, for root with 5 to 6 per cent. rotenone. Our correspondent adds:—

"The trade here anticipates that derris root will before next season approach even more closely the price of cubé root from Brazil as only when this comes about can derris root obtain an equal share of the U.S. trade."

Gambier:—Block gambier dropped from $7.50 to $7.25 at the end of August, the average price for the month being $7.44 per picul as compared with $7.50 in July. Cube No. 1 was quoted throughout August at $15 per picul as compared with an average price of $15.10 in July.

Tapioca:—Tapioca was quoted throughout August at the following prices per picul:—Flake Fair $4.10, Seed Pearl $3.90, Medium Pearl $4.50.

Sago:—Pearl, Small, Fair continued to be quoted at $3.75 per picul. Flour, Sarawak Fair appreciated in price—from $1.97½ at the beginning of August to $2.15 per picul at the end of the month—the average price for August being $2.04 per picul as compared with $2.05 in July.

Tobacco:—In the more important centres of production, uncured leaf sold for $4 to $5 per picul. The general average of prices of cured leaf was per picul:—1st quality $25 to $50, 2nd quality $20 to $40, 3rd quality $15 to $30. With the advent of rains, new areas have been planted in several districts. Prices in Kelantan remain very high and the local factory demand exceeds local supply. Prices per picul of cured leaf were:—Grade I $100 to $160, Grade II $80 to $128, Grade III $40 to $112.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm Oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Messrs. Hooglandt & Co., Singapore.

1 picul = 133 1/3 lbs. The Dollar is fixed at two shillings and four pence.

Note:— The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57 Trafalgar Square, London W.C.2.

GENERAL RICE SUMMARY*

July, 1938.

Malaya.—The imports of foreign rice during July were 63,171 tons† and exports 12,774 tons, net imports being 50,397 tons as compared with 53,176 tons in 1937.¶ Net imports for the first seven months of 1938 amounted to 352,667 tons as compared with 317,520 tons in 1937.

On the July imports, 45 per cent. were consigned to Singapore, 17 per cent. to Penang, 6 per cent. to Malacca, 23 per cent. to the Federated Malay States and 9 per cent. to the Unfederated Malay States. The July gross foreign imports by countries of origin were as follows (in tons, percentages in brackets):—Siam 42,143 (66.7); Burma 19,206 (30.4), French Indo-China 925 (1.5), other countries 897 (1.4). Net imports in July 1938 by countries of origin, were as follows (in tons): Siam 31,622, Burma 17,408, French Indo-China 570, elsewhere 797.

For the first seven months of 1938, total imports of rice into Malaya amounted to 461,539 tons, of which 63.6 per cent. was Siam rice, and 32.5 per cent. Burma rice.

Of the exports during July 1938, 75 per cent. were consigned to the Netherlands Indies, and 25 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):—Siam 10,521 (82.3), Burma 1,798 (14.1), French Indo-China 355 (2.8), parboiled 39 (0.3), Malayan production 61 (0.5).

India and Burma.—Foreign exports for the first half year 1938 were 137,000 tons, as compared with 587,000 tons in 1937, a decrease of 76.7 per cent. Of these exports, 3.7 (4.4) per cent. were to the United Kingdom, 5.8 (6.5) per cent. to the Continent of Europe, 38.0 (27.2) per cent. to Ceylon, 5.1 (23.7) per cent. to the Straits Settlements and the Far East, and 47.4 (38.2) per cent. to other countries. The percentages in brackets are for 1937.

Burma's exports for the period 1st January to 27th July, 1938, amounted to 2,191,180 tons, as compared with 2,203,003 tons in 1937, a decrease of 0.5 per cent. Of the 1938 exports, 42.0 (46.9) per cent. were to India, 9.4 (8.8) per cent. to the United Kingdom, 8.6 (9.4) per cent. to the Continent of Europe, 11.1 (10.6) per cent. to Ceylon, 13.6 (11.7) per cent. to the Straits Settlements and the Far East, and 15.3 (12.6) per cent. to other countries. The figures in brackets are for 1937.

Average July price in rupee cents per 100 baskets of 75 lbs. each at Rangoon were 219 for Big Mills Specials, and 234 for Small Mills Specials.

* Abridged from the Rice Summary for July 1938, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout the Summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937.

Siam.—Exports of rice and rice products from Bangkok during May were 132,969 tons, as compared with 64,141 tons in 1937. For the first five months of 1938, exports amounted to 698,490 tons, as compared with 440,833 tons in 1937.

Japan.—The latest information available was published in the General Rice Summary for June 1938.

French Indo-China.—Entries of padi into Cholon during the first seven months of 1938 were 771,255 tons, as compared with 987,852 tons in 1937, a decrease of 21.9 per cent. Exports of rice during the same period were 796,673 tons as compared with 902,385 tons in 1937, a decrease of 11.7 per cent.

The Saigon rice report of June 1938, received from His Majesty's Consul at Saigon, states:—"Prices of rice and padi showed a slight but continual increase. This tendency was seen in rice prices throughout the month despite small demand in the first two weeks from France and Hong Kong. The opening, mid-month and closing figures were $3.37 per picul, $3.38 per picul and $3.43 per picul respectively." Padi prices per picul on the same dates were as follows: $2.14, $2.17 and $2.22 respectively. (Prices are in S.S. currency and a picul of 133⅓ lbs).

Netherlands Indies.—The latest information available was published in the General Rice Summary for May, 1938.

Ceylon.—Imports of rice for the first seven months of 1938 amounted to 327,813 tons, as compared with 312,144 tons in 1937, an increase of 5 per cent. Of these imports 17.4 (17.1) per cent. were from British India, 71.3 (69.5) per cent. from Burma, 0.3 (0.1) per cent. from the Straits Settlements, and 11.0 (11.3) per cent. from other countries. The percentages are for 1937.

Europe and America.—Shipments from the East to Europe for the period 1st January to 7th July, 1938, totalled 794,375 tons, as compared with 740,688 tons in 1937, an increase of 7.2 per cent. Of these shipments, 45.5 (46.9) per cent. were from Burma, 41.3 (35.5) per cent. from Saigon, 8.6 (5.3) per cent. from Siam and 1.6 (2.3) per cent. from Bengal. The figures in brackets are the corresponding percentages in 1937.

Shipments for the Levant from 1st. January to 27th June, 1938, were 24,262 tons, as compared with 10,265 tons in 1937, an increase of 136.4 per cent.

Shipments for Cuba, West Indies and America from 1st. January to 24th June, 1938, were 111,858 tons, as compared with 139,446 tons in 1937, a decrease of 19.8 per cent.

[*Commerce Reports* for July 9, 1938 states: "Exports of rice were banned by the Shanghai Chinese Rice Guild on June 25, because of low local stocks, and retail prices now have reached the municipal price limit of 14 yuan per 150 pounds." *Ed. M.A.J.*].

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1938	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January	2,241.7	1,309.2	383.7	232.0
February	2,040.4	1,457.1	370.4	261.0
March	2,359.6	1,843.1	446.8	344.0
April	1,963.7	1,122.6	353.6	218.0
May	1,491.7	1,480.7	274.8	258.0
June	1,773.5	1,781.2	315.9	247.0
July	2,546.5	2,134.2	450.8	311.0
Total	14,417.1	11,128.1	2,596.0	1,871.0
Total January to July, 1937 ...	13,026.3	10,184.8	2,309.0	1,655.3
Total for the year 1937 ...	27,733.5	17,932.8	5,094.7	2,811.4

Stocks on estates as at 31st July, 1938 were palm oil 2,117 tons, palm kernels 738 tons.

MALAYAN RUBBER STATISTICS

Acreages of Tappable Rubber actually Tapped and not Tapped on Estates of 100 Acres and over, for the Month ending 31st July, 1938.

State or Territory	Estimated Acreages of Tappable Rubber	Actual area tapped during the month Acreage	Percentage of (3) to (2)	Acreages of tappable rubber not tapped: Estates which have entirely ceased tapping — Acreage	Percentage of (5) to (2)	On estates which have partly ceased tapping: Otherwise than under rotational systems — Acreage	Percentage of (7) to (2)	Under rotational systems — Acreage	Percentage of (9) to (2)	Area of Tappable Rubber never been tapped — Acreage	Percentage of (11) to (2)	Total area not tapped (5) + (7) + (9)	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ...	43,319	19,601	45.2	932	2.2	14,080	32.5	8,706	20.1	426	1.0	23,718	54.8
Malacca ...	121,829	58,590	48.1	3,735	3.1	27,784	22.8	31,720	26.0	2,077	1.7	63,239	51.9
Penang ...	2,488	1,213	48.8	nil	nil	1,215	48.8	60	2.4	18	0.7	1,275	51.2
Singapore ...	32,415	16,421	50.7	4,332	13.4	6,401	19.7	5,261	16.2	163	0.5	15,994	49.3
Total S.S. ...	200,051	95,825	47.9	8,999	4.5	49,480	24.7	45,747	22.9	2,684	1.3	104,226	52.1
F. M. S.—													
Perak ...	286,435	160,358	56.0	7,117	2.5	65,507	22.9	53,453	18.6	6,594	2.3	126,077	44.0
Selangor ...	323,990	196,848	60.8	6,454	2.0	56,182	17.3	64,506	19.9	6,542	2.0	127,142	39.2
Negri Sembilan ...	255,047	141,910	55.6	7,430	2.9	55,109	21.6	50,598	19.9	7,506	2.9	113.137	44.4
Pahang ...	86,362	49,252	57.0	3,164	3.7	22,091	25.6	11,855	13.7	5,943	6.9	37,110	43.0
Total F.M.S. ...	951,834	548,368	57.6	24,165	2.5	198,889	20.9	180,412	19.0	26,585	2.8	403,466	42.4
U. M. S.—													
Johore ...	476,295	284,923	59.8	12,721	2.7	107,788	22.6	70,863	14.9	32,628	6.9	191,372	40.2
Kedah ...	196,667	115,743	58.9	7,252	3.7	31,661	16.1	42,011	21.3	6,517	3.3	80,924	41.1
Kelantan ...	31,188	20,204	64.8	252	0.8	6,276	20.1	4,455	14.3	1,899	6.1	10,984	35.2
Trengganu (*b*) ...	4,817	3,182	66.1	nil	nil	74	1.5	1,561	32.4	74	1.5	1,635	33.9
Perlis (*c*) ...	1,371	667	48.7	224	16.3	417	30.4	63	4.6	86	6.3	704	51.3
Brunei ...	5,692	2,954	51.9	nil	nil	1,895	33.3	843	14.8	301	5.3	2,738	48.1
Total U.M.S. ...	716,030	427,673	59.7	20,450	2.9	148,111	20.7	119,796	16.7	41,505	5.8	288,357	40.3
Total Malaya ...	1,867,915	1,071,866	57.4	53,614	2.9	396,480	21.2	345,955	18.5	70,774	3.8	796,049	42.6

Notes:—(*a*) The acreage shown in column (11) is included in columns (5) and (7).
(*b*) Registered companies only.
(*c*) Rendered quarterly.

MALAYAN RUBBER STATISTICS Table I.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF JULY, 1938 IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to July 1938		during the month		January to July 1938						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to July 1938	during the month	Jan. to July 1938	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to July 1938
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	9,944	15,125	10,506	79,307	4,183	37,833	Nil	Nil	Nil	Nil	12,073	664	87,834	25,340	...	10,260	16,743	18	110
Johore ...	...	5,005	6,152	4,622	36,409	2,018	21,966	Nil	39	Nil	144	2,535	4,355	21,683	35,524	...	4,043	6,903	...	...
Kedah ...	...	325	3,836	2,538	19,704	951	6,412	Nil	Nil	Nil	Nil	1,417	1,595	12,547	13,060	...	345	4,293	...	...
Perlis ...	...	20	26	12	94	20	159	Nil	Nil	Nil	Nil	Nil	22	Nil	222	...	31	25	...	...
Kelantan ...	...	798	390	358	2,549	491	4,492	Nil	Nil	Nil	Nil	263	611	1,910	5,044	...	728	445	...	...
Trengganu ...	...	55	50	237	1,857	119	929	Nil	Nil	Nil	Nil	Nil	356	Nil	2,786	...	55	50	...	...
Brunei ...	...	Nil	54	46	326	53	482	...	...	...	...	...	79	...	809	...	17	57	...	...
Total Malay States	...	16,147	25,633	18,329	140,246	7,835	72,273	Nil	39	Nil	144	16,288	7,682	123,974	82,785	...	15,479	28,516	18	110
S. SETTLEMENTS :—																				
Malacca ...	...	2,400	1,655	947	7,923	52	3,860	Nil		Nil		2,122		17,048		...	2,299	1,664	...	...
Province Wellesley ...	...	2,454	738	378	2,955	154	1,611	Nil		Nil				52,901		...	3,081	735	...	...
Penang ...	2,754	5,751	7	18	130	26	596	3,289	10,093	16,630	87,490	7,137	Nil		Nil	1,149	5,660	15	...	...
Singapore ...	4,558	31,675	207	123	1,047	27	409	15,377		80,397		18,142		130,215		4,716	34,011	245	24	173
Labuan ...	...	49	Nil	Nil	Nil	3	84	47		328		Nil		Nil		...	47	Nil	...	...
Total Straits Settlements ...	7,312	42,329	2,607	1,466	12,055	262	6,560	18,713	10,093	97,355	87,490	27,401	Nil	200,164	Nil	5,865	45,098	2,659	24	173
Total Malaya ...	7,312	58,476	28,240	19,795	152,301	8,097	78,833	18,713	10,132	97,355	87,634	43,689	7,682	324,138	82,785	5,865	60,577	31,175	42	283

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	9,067	31,141	5,495	5,248	3,284	145
WET RUBBER	1,193	870	165	196	759	200
TOTAL ...	10,260	34,011	5,660	5,444	4,043	345

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to July 1938
29	30	31
Singapore ...	28,111	213,078
Penang ...	11,254	78,675
Port Swettenham.	4,129	30,881
Malacca ...	195	1,504
MALAYA ...	43,689	324,138

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to July 1938
32	33	34
Malay States ...	23,933	206,338
Straits Settlements	1,928	17,666
MALAYA ...	25,861	224,004

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Acting Registrar-General of Statistics, S.S and F.M.S., at Singapore on 23nd August, 1938

METEOROLOGICAL SUMMARY, MALAYA, JULY, 1938.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	92.6	71.5	82.1	97	68	87	74	84.1	85.1	1.12	28.4	0.67	6	5				208.55	6.73	55
Bukit Jeram, Selangor ...	89.9	72.7	81.3	92	69	87	75	86.0	87.6	2.06	52.3	1.16	9	5	2		1	251.00	8.10	66
Sitiawan, Perak ...	91.4	72.2	81.8	94	68	87	75	84.7	85.4	0.76	19.3	0.28	9	5		1		236.10	7.62	62
Ipoh Aerodrome, Perak ...	91.2	71.7	81.5	94	68	85	74	83.7	84.7	2.40	51.0	0.82	9	7	4			209.15	6.75	54
Temerloh, Pahang ...	91.4	71.7	81.5	95	69	82	75	85.8	87.1	4.96	126.0	1.64	11	8	1	8		215.45	6.95	57
Kuala Lipis, Pahang ...	91.3	71.2	81.3	96	68	85	74	85.3	85.9	4.14	105.2	1.54	10	6	3	15		195.00	6.29	51
Kuala Pahang, Pahang ...	87.4	74.0	80.7	93	72	81	77	86.9	88.2	3.67	93.2	1.06	9	8	5		2	253.00	8.16	66
Kallang Aerodrome, S'pore ...	86.4	76.5	81.5	90	71	80	69	83.3	84.3	6.21	157.7	1.62	12	9	5		1	235.15	7.59	62
Bayan Lepas Aerodrome Penang ...	87.9	74.1	81.0	90	68	80	76	84.5	85.2	4.80	121.9	1.94	14	11	1			240.75	7.77	63
Malacca Town, Malacca ...	86.8	74.0	80.4	90	71	83	82	85.9	86.5	7.71	195.8	3.74	13	11	8		3	240.75	7.77	64
Kluang, Johore ...	88.9	70.7	79.8	92	68	79	74	82.0	82.9	2.31	58.7	0.87	9	7	1	5		207.70	6.70	55
Mersing, Johore ...	87.4	71.2	79.3	90	69	81	74	82.6	82.9	4.70	119.4	1.44	13	12	2		4	220.45	7.11	58
Alor Star, Kedah ...	88.5	73.8	81.1	91	70	80	76	84.9	85.9	2.96	75.2	1.47	11	6				246.75	7.96	64
Kota Bahru, Kelantan ...	89.7	73.1	81.4	92	71	86	76	84.7	85.5	5.14	130.6	1.21	11	7	4	1		241.35	7.79	63
Kuala Trengganu, Trengganu	88.3	72.5	80.4	92	69	83	76	83.5	85.5	4.02	102.7	1.11	13	7	3	1		218.20	7.04	57
Labuan ...	87.3	76.3	81.8	91	72	83	80	86.0	87.1	10.27	260.9	2.38	17	16	3		2	231.35	7.46	60
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	75.4	62.6	69.0	78	67	71	64	72.1	72.7	3.78	96.0	1.59	13	10	5	5	2	212.90	6.87	56
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	73.3	54.3	63.8	77	47	70	60	70.1	70.6	4.75	120.7	0.95	13	12	1			172.90	5.58	45
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	73.2	59.3	66.3	77	57	69	61			4.76	120.9	1.16	13	12				185.10	5.97	48

Compiled from Returns supplied by the Meteorological Branch, Malaya.